

# CLAIMS

1. An optical recording material comprising an organic dye compound A whose absorption maximum wavelength ( $\lambda_{\max}$ ) is not less than 340 nm and not more than 440 nm and a metal-complex compound B whose absorption maximum wavelength ( $\lambda_{\max}$ ) is not less than 500 nm and not more than 900 nm, wherein

the content of the organic dye compound A is higher than the content of the metal-complex compound B, and

a light resistance x calculated by the following formula is not less than 30%:

$$\text{Light resistance } x = \{ (I_1/I_0) \times 100 \}$$

(wherein,  $I_0$  is the absorbance at the absorption maximum present in the wavelength range from 340 nm to 440 nm in the absorption spectrum of a film of a mixture of the organic dye compound A and the metal-complex compound B measured by a spectrophotometer; and  $I_1$  is the absorbance at the absorption maximum present in the wavelength range from 340 nm to 440 nm in the absorption spectrum, measured by the spectrophotometer, of the film of the mixture of the organic dye compound A and the metal-complex compound B after light irradiation treatment).

2. The optical recording material according to claim 1, wherein, as for the organic dye compound A, the light resistance  $x = \{ (I_{A1}/I_{A0}) \times 100 \}$  calculated with the absorbance ( $I_{A0}$ ) of the absorption maximum present in the wavelength range from 340 nm to 440 nm in the absorption spectrum of the

film measured by the spectrophotometer and the absorbance ( $I_{A1}$ ) of the absorption maximum present in the wavelength range from 340 nm to 440 nm in the absorption spectrum of the film of the organic dye compound A measured after a light irradiation treatment is less than 30%.

3. The optical recording material according to claim 1 or 2, wherein the light resistance  $x$  is calculated by the following operation steps:

(Operation steps)

(Step 1) Spin-coating a transparent substrate with a solution containing the organic dye compound A and the metal-complex compound B, then drying to prepare a dye coated disc;

(Step 2) Measuring the absorption spectrum of the dye coated disc prepared in the (Step 1) at the wavelength of 300 nm to 900 nm with a spectrophotometer, and determining  $I_0$  as the absorbance at the absorption maximum present in the wavelength range from 340 nm to 440 nm;

(Step 3) Subjecting the dye coated disc prepared in the (Step 1) to a light irradiation treatment of irradiating with a xenon lamp at  $250 \text{ W/m}^2$  for 8 hours, then measuring the absorption spectrum under the same condition as in (Step 2), and determining  $I_1$  as the absorbance at the absorption maximum present in the wavelength range from 340 nm to 440 nm; and

(Step 4) Calculating  $\{(I_1/I_0) \times 100\}$  based on the ( $I_0$ ) at the (Step 2) and the ( $I_1$ ) at the (Step 3).

4. The optical recording material according to any one of claims 1 to 3, wherein the content of the metal-complex

compound B is not less than 20% by weight and not more than 40% by weight, assuming a total amount of the organic dye compound A and the metal-complex compound B as 100% by weight, when the absorption maximum wavelength ( $\lambda_{\max}$ ) of the metal-complex compound B is 500 nm to 620 nm.

5. The optical recording material according to any one of claims 1 to 4, wherein the difference between the absorption maximum wavelength ( $\lambda_{\max}$ ) of the organic dye compound A and the absorption maximum wavelength ( $\lambda_{\max}$ ) of the metal-complex compound B is 100 nm or more.

6. The optical recording material according to claim 1 or 5, wherein the absorption maximum wavelength ( $\lambda_{\max}$ ) of the metal-complex compound B is 680 nm to 900 nm.

7. The optical recording material according to any one of claims 1 to 6, wherein the light resistance x is 50% or more.

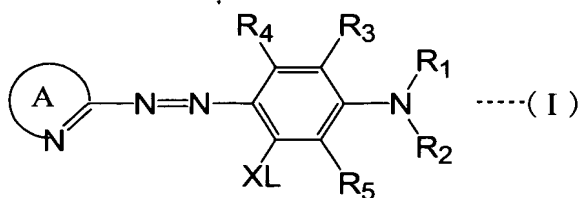
8. The optical recording material according to any one of claims 1 to 7, wherein the organic dye compound A is at least one selected from the group consisting of a  $\gamma$ -pyrone organic dye, a  $\gamma$ -thiopyrone organic dye, a  $\gamma$ -1,1-dioxothiopyrone organic dye, a  $\gamma$ -pyridone organic dye, a coumalin organic dye, a carbostyryl organic dye and a 1-thiocoumarin organic dye.

9. The optical recording material according to any one of claims 1 to 8, wherein the metal-complex compound B is an azo metal-complex compound or an indoaniline metal-complex compound.

10. The optical recording material according to claim 9, wherein the metal-complex compound B is an azo metal-complex

compound comprising a metal ion and an azo compound represented by the following general formula (I):

[Chem. 1]



(In the formula (I), ring A is a nitrogen-containing heterocyclic aromatic ring formed with a carbon atom and a nitrogen atom, and XL represents a substituent in which X becomes an anion and capable of coordinating to a metal ion when L is eliminated; R<sub>1</sub> and R<sub>2</sub> each independently represent a hydrogen atom, a linear or branched alkyl group, a cyclic alkyl group, an aralkyl group or an alkenyl group, or each may form a condensed ring with an adjacent substituent group or with each other; R<sub>3</sub>, R<sub>4</sub> and R<sub>5</sub> each independently represent a hydrogen atom, a linear or branched alkyl group having 1 to 12 carbon atoms, a cyclic alkyl group having 3 to 12 carbon atoms, a linear or branched alkenyl group having 2 to 12 carbon atoms, an aralkyl group having 7 to 18 carbon atoms, a linear or branched alkoxy group having 1 to 12 carbon atoms, a linear or branched alkylthio group having 1 to 12 carbon atoms, a monocyclic saturated heterocyclic group, a halogen atom, a nitro group, a cyano group, a mercapto group, a hydroxy group, a formyl group, an acyl group represented by -COR<sub>34</sub>, an amino group represented by -NR<sub>35</sub>R<sub>36</sub>, an acylamino group represented by -NHCOR<sub>37</sub>, a carbamate group represented by -NHCOOR<sub>38</sub>, a

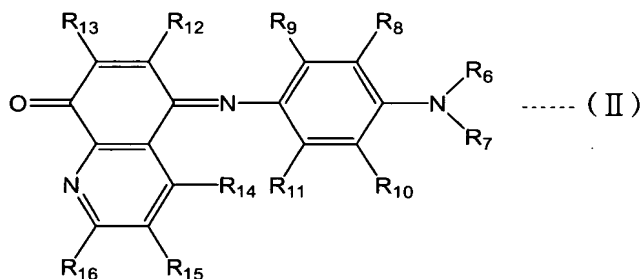
carboxylic acid ester group represented by  $-\text{COOR}_{39}$ , an acyloxy group represented by  $-\text{OCOR}_{40}$ , a carbamoyl group represented by  $-\text{CONR}_{41}\text{R}_{42}$ , a sulfonyl group represented by  $-\text{SO}_2\text{R}_{43}$ , a sulfinyl group represented by  $-\text{SOR}_{44}$ , a sulfamoyl group represented by  $-\text{SO}_2\text{NR}_{45}\text{R}_{46}$ , a sulfonic acid ester group represented by  $-\text{SO}_3\text{R}_{47}$  or a sulfonamide group represented by  $-\text{NHSO}_2\text{R}_{48}$  (wherein  $\text{R}_{34}$ ,  $\text{R}_{37}$ ,  $\text{R}_{38}$ ,  $\text{R}_{39}$ ,  $\text{R}_{40}$ ,  $\text{R}_{43}$ ,  $\text{R}_{44}$ ,  $\text{R}_{47}$  and  $\text{R}_{48}$  each independently represent any of a hydrocarbon group or a heterocyclic group, and  $\text{R}_{35}$ ,  $\text{R}_{36}$ ,  $\text{R}_{41}$ ,  $\text{R}_{42}$ ,  $\text{R}_{45}$  and  $\text{R}_{46}$  each independently represent any of a hydrogen atom, a hydrocarbon group or a heterocyclic group)).

11. The optical recording material according to claim 10, wherein, in the azo compound represented by the general formula (I), the ring A represents a 5- or 6-membered monocyclic or bicyclic fused nitrogen-containing heterocyclic aromatic ring, XL represents a hydroxy group, a sulfonate group, acylamino group, sulfonamide group, mercapto group, a carboxyl group,  $\text{R}_1$  and  $\text{R}_2$  each independently represent a linear or branched alkyl group having 1 to 12 carbon atoms, a cyclic alkyl group having 3 to 12 carbon atoms, an aralkyl group having 7 to 12 carbon atoms, or each may form a saturated condensed ring with an adjacent substituent group or with each other,  $\text{R}_3$ ,  $\text{R}_4$  and  $\text{R}_5$  each independently represent a hydrogen atom, a linear or branched alkyl group having 1 to 8 carbon atoms, an aralkyl group having 7 to 12 carbon atoms, a linear or branched alkoxy group having 1 to 8 carbon atoms, a linear or branched alkylthio group having 1 to 8 carbon atoms,

a monocyclic 5- or 6-membered-ring saturated heterocyclic group, a halogen atom, a nitro group, a cyano group, a mercapto group, a hydroxy group, an acyl group represented by  $-\text{COR}_{34}$ , an amino group represented by  $-\text{NR}_{35}\text{R}_{36}$ , an acylamino group represented by  $-\text{NHCOR}_{37}$ , a carbamate group represented by  $-\text{NHCOOR}_{38}$ , a carboxylic acid ester group represented by  $-\text{COOR}_{39}$ , an acyloxy group represented by  $-\text{OCOR}_{40}$ , a carbamoyl group represented by  $-\text{CONR}_{41}\text{R}_{42}$ , a sulfonyl group represented by  $-\text{SO}_2\text{R}_{43}$ , a sulfamoyl group represented by  $-\text{SO}_2\text{NR}_{45}\text{R}_{46}$ , a sulfonamide group represented by  $-\text{NHSO}_2\text{R}_{48}$ .

12. The optical recording material according to claim 9, wherein the metal-complex compound B is a metal-complex compound comprising a metal ion and an arbitrary anion and a compound represented by the following general formula (II).

[Chem. 2]



(In the formula (II),  $\text{R}_6$  and  $\text{R}_7$  each independently represent a hydrogen atom, a linear or branched alkyl group, a cyclic alkyl group, an aralkyl group, an alkenyl group, or each may form a condensed ring with an adjacent substituent group or with each other;  $\text{R}_8$  to  $\text{R}_{16}$  each independently represent a hydrogen atom, a linear or branched alkyl group having 1 to 12 carbon atoms, a cyclic alkyl group having 3 to 12 carbon

atoms, a linear or branched alkenyl group having 2 to 12 carbon atoms, an aralkyl group having 7 to 18 carbon atoms, a linear or branched alkoxy group having 1 to 12 carbon atoms, a linear or branched alkylthio group having 1 to 12 carbon atoms, a saturated or unsaturated heterocyclic group, an aryl group having 6 to 18 carbon atoms, a halogen atom, a nitro group, a cyano group, a mercapto group, a hydroxy group, a formyl group, an acyl group represented by  $-\text{COR}_{34}$ , an amino group represented by  $-\text{NR}_{35}\text{R}_{36}$ , an acylamino group represented by  $-\text{NHCOR}_{37}$ , a carbamate group represented by  $-\text{NHCOOR}_{38}$ , a carboxylic acid ester group represented by  $-\text{COOR}_{39}$ , an acyloxy group represented by  $-\text{OCOR}_{40}$ , a carbamoyl group represented by  $-\text{CONR}_{41}\text{R}_{42}$ , a sulfonyl group represented by  $-\text{SO}_2\text{R}_{43}$ , a sulfinyl group represented by  $-\text{SOR}_{44}$ , a sulfamoyl group represented by  $-\text{SO}_2\text{NR}_{45}\text{R}_{46}$ , a sulfonic acid ester group represented by  $-\text{SO}_3\text{R}_{47}$  or a sulfonamide group represented by  $-\text{NHSO}_2\text{R}_{48}$  (wherein  $\text{R}_{34}$ ,  $\text{R}_{37}$ ,  $\text{R}_{38}$ ,  $\text{R}_{39}$ ,  $\text{R}_{40}$ ,  $\text{R}_{43}$ ,  $\text{R}_{44}$ ,  $\text{R}_{47}$  and  $\text{R}_{48}$  each independently represent a hydrocarbon group or a heterocyclic group, and  $\text{R}_{35}$ ,  $\text{R}_{36}$ ,  $\text{R}_{41}$ ,  $\text{R}_{42}$ ,  $\text{R}_{45}$  and  $\text{R}_{46}$  each independently represent a hydrogen atom, a hydrocarbon group or a heterocyclic group)).

13. The optical recording material according to claim 12, wherein the arbitrary anion is a monovalent monodentate ligand.

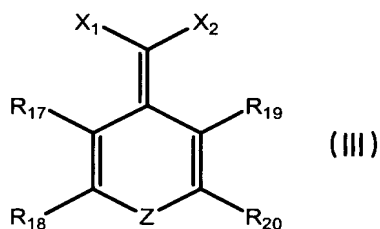
14. The optical recording material according to any one of claims 1 to 13, wherein the metal-complex compound B is a

metal-complex compound having a divalent or trivalent transition metal ion.

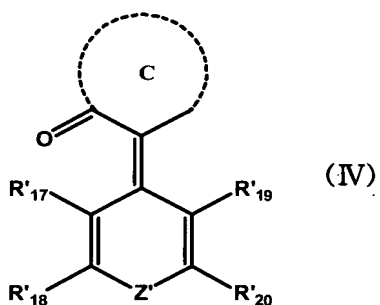
15. The optical recording material according to claim 14, wherein the transition metal is at least one selected from the group consisting of nickel, cobalt, copper, iron, zinc, platinum, palladium and manganese.

16. The optical recording material according to any one of claims 1 to 15, wherein the organic dye compound A is selected from the compounds represented by the following general formulae (III) and (IV):

[Chem. 3]



[Chem. 4]



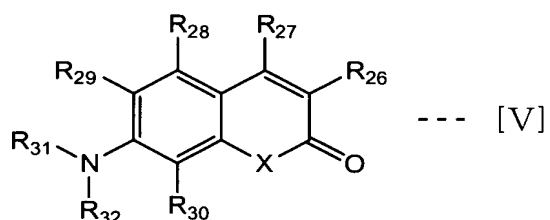
(In the formula (III) or (IV), R<sub>17</sub> to R<sub>20</sub> and R'<sub>17</sub> to R'<sub>20</sub> each independently represent a hydrogen atom or a linear or branched alkyl group having 1 to 12 carbon atoms, a cyclic alkyl group having 3 to 12 carbon atoms, a linear or branched alkenyl group having 2 to 12 carbon atoms, an aralkyl group

having 7 to 18 carbon atoms, a linear or branched alkoxy group having 1 to 12 carbon atoms, a linear or branched alkylthio group having 1 to 12 carbon atoms, a saturated or unsaturated heterocyclic group, an aryl group having 6 to 18 carbon atoms, a halogen atom, a nitro group, a cyano group, a mercapto group, a hydroxy group, a formyl group, an acyl group represented by  $-\text{COR}_{34}$ , an amino group represented by  $-\text{NR}_{35}\text{R}_{36}$ , an acylamino group represented by  $-\text{NHCOR}_{37}$ , a carbamate group represented by  $-\text{NHCOOR}_{38}$ , a carboxylic acid ester group represented by  $-\text{COOR}_{39}$ , an acyloxy group represented by  $-\text{OCOR}_{40}$ , a carbamoyl group represented by  $-\text{CONR}_{41}\text{R}_{42}$ , a sulfonyl group represented by  $-\text{SO}_2\text{R}_{43}$ , a sulfinyl group represented by  $-\text{SOR}_{44}$ , a sulfamoyl group represented by  $-\text{SO}_2\text{NR}_{45}\text{R}_{46}$ , a sulfonic acid ester group represented by  $-\text{SO}_3\text{R}_{47}$  and a sulfonamide group represented by  $-\text{NHSO}_2\text{R}_{48}$  (wherein  $\text{R}_{34}$ ,  $\text{R}_{37}$ ,  $\text{R}_{38}$ ,  $\text{R}_{39}$ ,  $\text{R}_{40}$ ,  $\text{R}_{43}$ ,  $\text{R}_{44}$ ,  $\text{R}_{47}$  and  $\text{R}_{48}$  each independently represent a hydrocarbon group or a heterocyclic group, and  $\text{R}_{35}$ ,  $\text{R}_{36}$ ,  $\text{R}_{41}$ ,  $\text{R}_{42}$ ,  $\text{R}_{45}$  and  $\text{R}_{46}$  each independently represent a hydrogen atom, a hydrocarbon group or a heterocyclic group, where,  $\text{R}_{17}$  and  $\text{R}_{18}$ ,  $\text{R}_{19}$  and  $\text{R}_{20}$ ,  $\text{R}_{17}'$  and  $\text{R}_{18}'$ ,  $\text{R}_{19}'$  and  $\text{R}_{20}'$  may be condensed with each other to form a hydrocarbon ring or a heterocyclic structure and the hydrocarbon ring and the heterocycles may have substituent),  $\text{X}_1$  is an electron-withdrawing group, and  $\text{X}_2$  is a hydrogen atom or  $-\text{Q}-\text{Y}$  ( $\text{Q}$  is a direct bond, an alkylene group having 1 or 2 carbon atoms, an arylene group or a heteroarylene group, and  $\text{Y}$  is an electron-withdrawing group, and the alkylene group, the arylene group, the heteroarylene group may have arbitrary

substituent groups besides Y); ring C is a carbocyclic ketone ring or a heterocyclic ketone ring which may have a substituent group along with C = O; Z and Z' each represent -O-, -S-, -SO<sub>2</sub>-, -NR<sub>21</sub>- (wherein R<sub>21</sub> is a hydrogen atom, a hydrocarbon group which may be substituted, a heterocyclic group which may be substituted, a cyano group, a hydroxy group), an amino group represented by -NR<sub>22</sub>R<sub>23</sub> (wherein R<sub>22</sub> and R<sub>23</sub> each independently represent a hydrogen atom, a hydrocarbon group or a heterocyclic group) or an acyl group represented by -COR<sub>24</sub> (R<sub>24</sub> is a hydrocarbon group or a heterocyclic group) or -COR<sub>25</sub> (R<sub>25</sub> is a hydrocarbon group or a heterocyclic group).

17. The optical recording material according to any one of claims 1 to 15, wherein the organic dye compound A is the compounds represented by the following general formula (V):

[Chem. 5]



(In the formula (V), X represents -O-, -S-, -NR<sub>33</sub>-; R<sub>26</sub>, R<sub>27</sub>, R<sub>28</sub>, R<sub>29</sub>, R<sub>30</sub> each independently represent a hydrogen atom or a linear or branched alkyl group having 1 to 12 carbon atoms, a cyclic alkyl group having 3 to 12 carbon atoms, a linear or branched alkenyl group having 2 to 12 carbon atoms, an aralkyl group having 7 to 18 carbon atoms, a linear or branched alkoxy group having 1 to 12 carbon atoms, a linear or branched

alkylthio group having 1 to 12 carbon atoms, an aryl group having 6 to 18 carbon atoms, a saturated or unsaturated heterocyclic group, a halogen atom, a nitro group, a cyano group, a mercapto group, a hydroxy group, a formyl group, an acyl group represented by  $-\text{COR}_{34}$ , an amino group represented by  $-\text{NR}_{35}\text{R}_{36}$ , an acylamino group represented by  $-\text{NHCOR}_{37}$ , a carbamate group represented by  $-\text{NHCOOR}_{38}$ , a carboxylic acid ester group represented by  $-\text{COOR}_{39}$ , an acyloxy group represented by  $-\text{OCOR}_{40}$ , a carbamoyl group represented by  $-\text{CONR}_{41}\text{R}_{42}$ , a sulfonyl group represented by  $-\text{SO}_2\text{R}_{43}$ , a sulfinyl group represented by  $-\text{SOR}_{44}$ , a sulfamoyl group represented by  $-\text{SO}_2\text{NR}_{45}\text{R}_{46}$ , a sulfonic acid ester group represented by  $-\text{SO}_3\text{R}_{47}$  or a sulfonamide group represented by  $-\text{NHSO}_2\text{R}_{48}$ ,  $\text{R}_{31}$ ,  $\text{R}_{32}$ ,  $\text{R}_{33}$  each independently represent a hydrogen atom, a linear or branched alkyl group, a cyclic alkyl group, an aralkyl group, a linear or branched alkenyl group, an acyl group, two adjacent among  $\text{R}_{26}$  to  $\text{R}_{33}$  may be linked to form a saturated hydrocarbon ring or a saturated heterocycle, where,  $\text{R}_{34}$ ,  $\text{R}_{37}$ ,  $\text{R}_{38}$ ,  $\text{R}_{39}$ ,  $\text{R}_{40}$ ,  $\text{R}_{43}$ ,  $\text{R}_{44}$ ,  $\text{R}_{47}$  and  $\text{R}_{48}$  each independently represent a hydrocarbon group or a heterocyclic group, and  $\text{R}_{35}$ ,  $\text{R}_{36}$ ,  $\text{R}_{41}$ ,  $\text{R}_{42}$ ,  $\text{R}_{45}$  and  $\text{R}_{46}$  each independently represent a hydrogen atom, a hydrocarbon group or a heterocyclic group.)

18. The optical recording material according to claim 15, wherein in the above-mentioned general formula (V), X is  $-\text{O}-$ ,  $-\text{NR}_{33}-$ , and  $\text{R}_{26}$ ,  $\text{R}_{27}$ ,  $\text{R}_{28}$ ,  $\text{R}_{29}$ ,  $\text{R}_{30}$  each independently represent a hydrogen atom or a linear or branched alkyl group having 1 to 8 carbon atoms, a cyclic alkyl group having 3 to 8 carbon

atoms, an aralkyl group having 7 to 12 carbon atoms, a linear or branched alkoxy group having 1 to 8 carbon atoms, a linear or branched alkylthio group having 1 to 8 carbon atoms, an aryl group having 6 to 12 carbon atoms, a saturated or unsaturated heterocyclic monocyclic or bicyclic fused ring group, a halogen atom, a nitro group, a cyano group, a mercapto group, a hydroxy group, a formyl group, an acyl group represented by  $-\text{COR}_{34}$ , an amino group represented by  $-\text{NR}_{35}\text{R}_{36}$ , an acylamino group represented by  $-\text{NHCOR}_{37}$ , a carbamate group represented by  $-\text{NHCOOR}_{38}$ , a carboxylic acid ester group represented by  $-\text{COOR}_{39}$ , an acyloxy group represented by  $-\text{OCOR}_{40}$ , a carbamoyl group represented by  $-\text{CONR}_{41}\text{R}_{42}$ , or a sulfonamide group represented by  $-\text{NHSO}_2\text{R}_{48}$ , and  $\text{R}_{31}$ ,  $\text{R}_{32}$ ,  $\text{R}_{33}$  each independently represent a linear or branched alkyl group having 1 to 12 carbon atoms, a cyclic alkyl group having 3 to 12 carbon atoms or an aralkyl group having 7 to 18 carbon atoms, and one or both of  $\text{R}_{29}$  and  $\text{R}_{31}$  and  $\text{R}_{30}$  and  $\text{R}_{32}$  may form a saturated hydrocarbon ring or a saturated heterocycle.

19. The optical recording material according to any one of claims 1 to 18, wherein the metal-complex compound B inhibits crystallization of the organic dye compound A.

20. The optical recording material according to any one of claims 1 to 19, wherein the decomposition starting temperature of the metal-complex compound B is not higher than the decomposition starting temperature of the organic dye compound A.

21. An optical recording medium capable of recording or reading of information, wherein the medium has

a substrate and

a recording layer provided on the substrate and capable of recording or reading of the information by light irradiation, and

the recording layer contains an optical recording material according to any one of claims 1 to 20.

22. The optical recording medium according to claim 21, wherein the light is a laser beam with a wavelength of 350 nm to 530 nm.